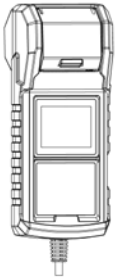
DHC®

Battery and Energy Management Solutions

BT1100



Battery and Electrical System Tester
Testeur de batterie et de système électrique
Prüfgerät für Batterien und elektrische Systeme
Probador de batería y sistema eléctrico
Tester per batterie e sistema elettrico
Dispositivo de teste de bateria e sistema elétrico

User Manual **EN**
Manuel d'utilisation **FR**
Benutzerhandbuch **DE**
Manual de usuario **ES**
Manuale dell'utente **IT**
Manual do usuário **PT**

English

Table of Contents

1. Before You Start 2
   1-1. Main Features 2
   1-2. Caution 2
   1-3. Warning 2
   1-4. Personal Safety Precautions 2
   1-5. Preparing To Test 3
   1-6. Operation and Use 4
   1-7. Paper Replacement 4
   1-8. Precaution For Using The Intergrated Printer 4
   1-9. How To Replace Clamp Set 5
   1-10. Installing and Replacing Internal Batteries 5
2. Battery Test 6
   2-1. 6V and 12V Battery Test 6
   2-2. Surface Charge 7
   2-3. Battery Test Results 8
3. System Test 9
   3-1. 12V and 24V System Test 9
   3-2. Cranking Test Results 10
   3-3. Idel Test Results 11
   3-4. Ripple Test Results 11
   3-5. Load On Test Results 12
4. IR Test (Internal Resistance Test) 13
5. Cable Diagnosis 13
6. Settings 14
7. History 15
8. DHC PC Software 15
9. Glossary 17
10. Terms and Conditions of Warranty 19
11. Return Goods 20
12. Remark 20

1. Before You Start

1-1. Main Features

1. 6V, 12V, and 12V start-stop battery test
2. 12V and 24V chanking and charging system test
3. Print out test results
4. Support DHC PC Software for test result management
5. Firmware update capability

1-2. Caution

Suggested ambient operating temp.: 0˚C (32˚F) to 50˚C (122˚F).

1-3. Warning

This product can expose you to chemicals including arsenic, which is known to the State of California to cause cancer.

For more information, go to www.P65Warnings.ca.gov

1. Working in the vicinity of a lead acid battery is dangerous. Batteries generate explosive gases during normal battery operation. For this reason, it is of utmost importance, if you have any doubt, that each time before using your tester, you read these instructions very carefully.
2. To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in the vicinity of the battery. Observe cautionary markings on these items.
3. Do not expose the tester to rain or snow.

1-4. Personal Safety Precautions

1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead acid battery.

2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
3. Wear safety glasses and protective clothing.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least ten minutes and get medical attention immediately.
5. Never smoke or allow a spark or flame in vicinity of battery or engine.
6. Be extra cautious to reduce risk of dropping a metal tool onto the battery. It could spark or short-circuit the battery or other electrical parts and could cause an explosion.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead acid battery. It can produce a short circuit current high enough to weld a ring or the like to metal causing a severe burn.

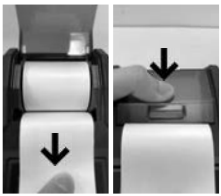
1-5. Preparing To Test

1. Be sure area around the battery is well ventilated while battery is being tested.
2. Clean battery terminals. Be careful to keep corrosion from contacting with eyes.
3. Inspect the battery for cracked or broken case or cover. If battery is damaged, do not use tester.
4. If the battery is not sealed maintenance free, add distilled water in each cell until battery acid reaches level specified by the manufacturer. This helps purge excessive gas from cells. Do not overfill.
5. If it is necessary to remove battery from vehicle to test, always remove ground terminal from battery first. Make sure all accessories in the vehicle are off to ensure you do not cause any arcing.

1-6. Operation and Use

Each time you connect the tester to a battery, the tester will run a quick cable verification to ensure a proper connection through the output cables to sensors in the clamp jaws. If the connection checks out OK, the tester will proceed to the Home Screen. If the connection is poor, the display will show “CHECK CABLE”. In this case, check cable connections for visible signs of damage, as you may need to re-connect the clamps to the battery or replace the cable end.

1-7. Paper Replacement



1. Open the paper roll cover.
2. Place a new paper roll in the compartment. Make sure the printing side faces the printing head.
3. Pull a short length of paper from the compartment and press down the cover to close.

1-8. Precaution For Using The Intergrated Printer

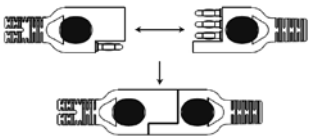
To prevent overheating the integrated printer, it is not recommended to operate the printer continuously without short breaks. The printer should be rested for at least 1 minute for every 2 minutes of continuous use.

There is no need to be worried under normal operation, where one test only requires one printout and continuous printing is highly unlikely. However, if the integrated printer does start to get warm, please allow it to cool down by temporarily halting any printing actions.

1-9. How To Replace Clamp Set

1. Detach the clamp set when in need of replacement.
2. Make sure the new clamp set is properly connected.

Do not detach the cables unless necessary to ensure the pins are not exposed to the moisture and acidic liquids which could cause rusting and corrosion.



1-10. Installing and Replacing Internal Batteries

Battery specification: six AA batteries

1. Unscrew the battery door fastening screw and lift up the battery door to access the battery compartment.
2. Pull the strap up at a 90-degree angle away from the batteries to remove depleted batteries.
3. Install fresh batteries. (always keep the strap under the batteries.)
4. Replace the battery door and tighten the fastening screw.





2. Battery Test

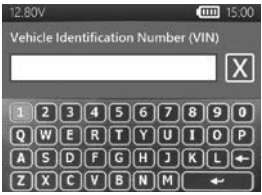
2-1. 6V and 12V Battery Test

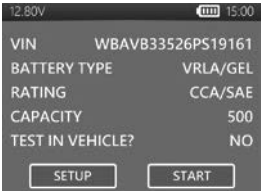
1. Select “Battery Test” from the main menu.
2. Enter VIN number
   1. Press ENTER when the input area is highlighted to initiate the virtual keyboard.
   2. Highlight the “X” icon and press ENTER to clear the input area.
   3. Skip the process by selecting “NEXT”.
3. Select “SETUP” to edit the battery testing criteria. (Testing criteria will be stored after each test, select “START” to reuse previous settings.)
4. Select battery type. (available types: FLOODED, AGM FLAT, AGM SPIRAL, VRLA/GEL, EFB.)
5. Select rating. (available ratings: CCA/SAE, DIN, EN, EN2, IEC, JIS, CA/MCA)
6. Select Capacity

   Available capacity range:

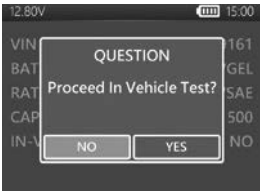
   25 to 3,000 CCA/SAE
   25 to 2,830 EN
   25 to 2,710 EN2
   25 to 1,985 IEC
   JIS (by battery type)
   25 to 1,685 DIN
   25 to 3,600 CA/MCA







7. Comfirm battery position by selecting the YES/ NO option of “TEST IN VEHICLE?”.



8. The tester will then check if the user would like to proceed to an In-Vehicle Test.
   - If YES, the tester will automatically proceed to the system test after the battery test is completed.
   - If NO, the tester will perform only the battery test.
9. Temperature compensation.
   - If battery temperature is above 0° C or 32° F, select YES.
   - If battery temperature is below 0° C or 32° F, select NO.
10. Test result will be presented after test is completed, use directional keys to review the test result. Select “PRINT” to print test result. Select “DONE” to return to the main menu.

2-2. Surface Charge

If the tester detects a surface charge, a pop-up notification will ask the user to turn on loads/headlights for 15 seconds to eliminate the surface charge.

Please note that vehicles with LED headlights and modern vehicle control modules might not be able to eliminate surface charge within 15 seconds and the pop-up may continue. Turn on more loads and repeat the process if this problem persists.

2-3. Battery Test Results

- **GOOD & PASS**
  The battery is good and capable of holding a charge.

- **GOOD & RECHARGE**
  The battery is good but needs to be recharged.

- **CAUTION**
  The battery may be serviced but performance will decline gradually. The battery may fail under extreme weather conditions and should be closely monitored, replacement might be necessary. Check battery connection and charging system to ensure the battery is properly charged.

- **RECHARGE & RETEST**
  Battery is discharged, the battery condition cannot be determined until it is fully charged. Recharge and retest the battery.

- **BAD & REPLACE**
  The battery will not hold a charge. It should be replaced immediately.

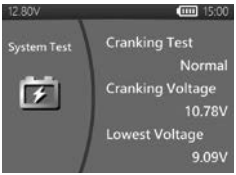
- **BAD CELL & REPLACE**
  The battery has at least one cell short circuit. It should be replaced immediately.

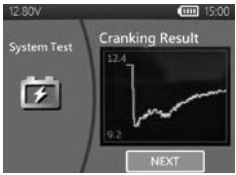
- **LOAD ERROR**
  Failed to measure battery condition, please make sure the battery is not over 3000CCA/SAE, clamps are properly connected to the battery, and clamps/cables are in a good state. Clamp/cable condition can be determined with the “Cable Diagnosis” tool. If the problem persists or clamp/cable need replacing, ask your dealer for replacement parts or further diagnostics.

3. System Test

3-1. 12V and 24V System Test

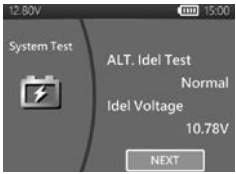
1. Select "System Test" from the main menu.
2. Enter the VIN of the vehicle.
   - Same input method as battery test.
3. Temperature compensation.
4. Turn off loads and start engine.



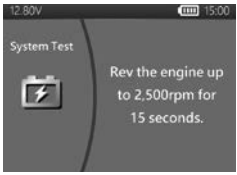


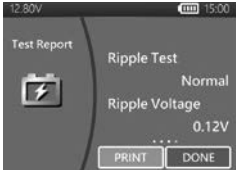
5. Use directional keys to review cranking test result.
6. Select "NEXT" to proceed to charging test.
7. "Is it a diesel engine?"
   - If YES, the tester will ask the user to rev the engine for 40 seconds before proceeding to idle and load on test.
   - If NO, the tester will proceed to the idle and load on test right away.
8. Select "NEXT" when idle test is completed and move on to the ripple and load on test.





9. Turn on loads and rev engine for 15 seconds. (The tester will countdown 15 seconds)
10. Once completed, the ripple and load test results are displayed.
11. Select “NEXT” to review the complete system test results including the cranking, idle, ripple, and load on test results.
12. Use directional keys to switch between 4 different pages of the system test results.
13. Select “PRINT” to print out the system test result.





3-2. Cranking Test Results

- **Cranking Voltage Normal**
  The system is showing normal draw.
- **Cranking Voltage Low**
  Cranking voltage is below normal limits, troubleshoot the starter with manufacturer recommended procedures.
- **Cranking Voltage Not Detechted**
  Cranking voltage is not detected.

3-3. Idel Test Results

- **Charging System Is Normal When Testing At Idel**
  The system is showing normal output from the alternator.
  No problem is detected.

- **High Charging Voltage When Testing At Idel**
  The voltage output from the alternator to the battery exceeds the normal limits of a functioning regulator.
  Check to ensure there is no loose connection and the ground connection is normal.
  If there is no connection issue, replace the regulator. Since most alternators have the regulator built-in, this will require you to replace the alternator. The normal high limit of a typical automotive regulator is 14.7 volts +/- 0.05.
  Check manufacturer specifications for the correct limit, as it will vary by vehicle type and manufacturer.

- **Low Charging Voltage When Testing At Idel**
  The alternator is not providing sufficient current to the battery.
  Check the belts to ensure the alternator is properly driven when engine is running.
  If the belts are slipping or broken, replace the belts and retest.
  Check the connections from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest. If the belts and connections are in good condition, replace the alternator.

3-4. Ripple Test Results

- **Normal Ripple Detected**
  Diodes are functioning properly in the alternator.

- **No Ripple Detected**
  Ripple is not detected.

- **Excess Ripple Detected**
  One or more diodes in the alternator are not functioning properly or the stator is damaged. Make sure the alternator mounting is rigid and the belts are not slipping or broken. If the mounting and belts are good, replace the alternator.

3-5. Load On Test Results

- **Charging System Voltage Normal When Load On Testing**
  The system is showing normal output from the alternator. No problem detected.

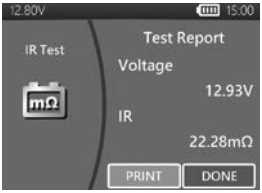
- **Charging System Voltage High When Load On Testing**
  The voltage output from the alternator to the battery exceeds the normal limits of a functioning regulator.
  Check to ensure there are no loose connections and that the ground connection is normal. If there are no connection issues, replace the regulator. Since most alternators have the regulator built-in, this will require you to replace the alternator.

- **Charging System Voltage Low When Load On Testing**
  The alternator is not providing sufficient current for the system's electrical loads and the charging current for the battery. Check the belts to ensure the alternator is rotating with the engine running. If the belts are slipping or broken, replace the belts and retest.
  Check the connections from the alternator to the battery. If the connection is loose or heavily corroded, clean or replace the cable and retest. If the belts and connections are in good working condition, replace the alternator.

4. IR Test (Internal Resistance Test)

1. Select IR Test from the main menu.
2. Use the clamps to connect with the battery directly.
3. Select battery temperature.
4. Once the IR test is completed, the tester will display the voltage and internal resistance value on the result page.
5. Select DONE to return to main menu or select PRINT to print out the IR test result.





5. Cable Diagnosis

1. Select “Cable Diagnosis” from the main menu to perform self diagnosis of the cable set.
2. Follow on screen instructions.
    1. Clamp on a battery that the voltage is above 12.4V. And make sure its posts are clean.
    2. Press ENTER to start.
3. Select START to start the cable diagnosis.
4. Result will be shown on the Test Report, use left and right key to switch between positive/negative cable test result explanation.

6. Settings

- **Backlight**
  1. Select “BACKLIGHT” and use directional keys to adjust the brightness of the display.
  2. Press ENTER to confirm the setting and return to settings menu. Or press BACK key to discard the change and return to the setting menu.

- **Language**
  1. Select “LANGUAGE” to choose the language wanted.
  2. Press ENTER to confirm the setting and return to settings menu. Or press BACK key to discard the change and return to the setting menu.

- **Date & Time**
  1. Select “DATE & TIME” to adjust the time.
  2. Use directional keys to adjust and press ENTER to proceed to the next item.
  3. Once completed, press BACK to return to the settings menu.

- **Information**
  1. Select “INFORMATION” to enable, disable, edit or erase the customized print out info.
  2. Press BACK to return to the settings menu.

- **Version**

  Select “VERSION” to check the current firmware version and serial number of the tester.

7. History

- **Test Result**
  1. Select “HISTORY” and then enter “TEST RESULT” to review test results within the last 7 days.
  2. Select the test type you want to review.
  3. Select “ERASE” to erase all test records saved on the tester.

- **Test Counter**
  If the “TEST COUNTER” is selected. The user may review the number of the tests that have been performed. Or print out the counter if needed.

8. DHC PC Software

NOTE:

DHC PC Software can be downloaded at the following sources:

1. On the disc included in the box. (selected models only)
2. At our website, www.dhc.com.tw.

Navigation instruction: DHC website → Support → Download

- **Connecting the tester to your PC**
  1. Launch DHC PC Software on your PC.
  2. Connect the tester to PC with a USB cable.

- **View Test Result**
  1. Click on the View Test Result icon.
  2. Select the type of test result you would like to review.
  3. Test results will then be presented with function buttons on the top left and search box on the top right.

- **Download Test Result**
  1. Click on the Download Test Result icon.
  2. Click START to initiate the download.

  After the download is finished, a pop-up window will appear, click “Yes” if you wish to clear all test result data on the tester, click “No” if otherwise.

- **Delete Test Result**
  1. Click on the Delete Test Result icon.
  2. Click “Yes” if you wish to clear all test result data on the tester.
  3. Click “No” if you wish to keep all existing test result data on the tester.

- **Update Firmware**
  1. Click on the Update Firmware icon.
  2. Select the update file provided by DHC.

  Warning:
  - Using firmware files from unknown sources may cause permanent damage to the tester.
  - Do not decompress the file.
  - Do not disconnect the tester while update is in progress.

- **Test Code**



  1. Click on the Test Code icon.
  2. Click ADD to add a new field.
  3. Enter the Test Code you would like to decode.
  4. Results will be displayed after a valid code is entered.

9. Glossary

- **What is a GEL battery?**

  A gel battery is a lead-acid electric storage battery that:

  1. is sealed using special pressure valves and should never be opened.
  2. is completely maintenance-free.*
  3. uses thixotropic gelled electrolyte.
  4. uses a recombination reaction to prevent the escape of hydrogen and oxygen gases normally lost in a flooded lead-acid battery (particularly in deep cycle applications).
  5. is non-spillable, and therefore can be operated in virtually any position. However, upside-down installation is not recommended.

  *Connections must be retorqued and the batteries should be cleaned periodically.

- **What is an AGM battery?**

  An AGM battery is a lead-acid electric storage battery that:

  1. is sealed using special pressure valves and should never be opened.
  2. is completely maintenance-free.*
  3. has all of its electrolyte absorbed in separators consisting of a sponge-like mass of matted glass fibers.
  4. uses a recombination reaction to prevent the escape of hydrogen and oxygen gases normally lost in a flooded lead-acid battery (particularly in deep cycle applications).
  5. is non-spillable, and therefore can be operated in virtually any position. However, upside-down installation is not recommended.

*Connections must be retorqued and the batteries should be cleaned periodically.

- **What is a VRLA battery?**
  Valve Regulated Lead Acid Battery –
  This type of battery is sealed Maintenance Free with a "bounce" valve or valves in the top of them that opens when a preset pressure is realized inside the battery and let's the excess gas pressure out. Then the valve resets itself.

- **What is a SLI battery?**
  These initials stand for Starting, Lighting and Ignition, which are the three basic functions which a battery has to perform on all normal vehicles. Batteries given this description will have been specifically designed for service on cars and trucks within a voltage controlled electrical system. Those SLI batteries which are intended for heavy haulage vehicles fitted with large diesel motors may often be called COMMERCIAL batteries. They have to be much more powerful and more robust than batteries intended for cars.

- **What is STATE OF HEALTH (SOH)?**
  It means how much battery capacity is left (%) comparing with the marked original battery capacity.

- **What is STATE OF CHARGE (SOC)?**
  It means how many percent of the battery is actually charged.

- **What is CCA (COLD CRANKING AMPS)?**
  The current in amperes which a new fully charged battery can deliver for 30 seconds continuously without the terminal voltage falling below 1.2volts per cell, after it has been cooled to 0OF and held at that temperature. This rating reflects the ability of the battery to deliver engine starting currents under winter conditions.

- **What is AMPERE-HOUR?**
  The unit of measurement of electrical capacity. A current of one ampere for one hour implies the delivery or receipt of one ampere-hour of electricity. Current multiplied by time in hours equals ampere-hours.

10. Terms and Conditions of Warranty

Any battery tester defective in material or workmanship will be repaired or replaced according to published defective return test repair procedures. The existence of a defect shall be determined by the seller in accordance with published procedures. The published test procedures are available upon request.

This warranty does not cover any unit that has been damaged due to accident, abuse, alternation, use for a purpose other than that for which it was intended, or failure to follow operating instructions.

This warranty is expressly limited to original retail buyers. This warranty is not assignable or transferable. Proof of purchase is required for all alleged claims. Warranty cannot be authorized without proof of purchase. Warranty claims must be sent pre-paid with dated proof of purchase. Damage incurred during shipment is the responsibility of the shipper (customer returning unit) If the returned unit qualifies for warranty, the shipper will only incur

shipping cost. The seller reserves the right to substitute or offer alternative warranty options at its discretion.

The sole and exclusive remedy for any unit found to be defective is repair or replacement, at the option of the seller. In no event shall the seller be liable for any direct, indirect, special, incidental, or consequential damages (including lost profit) whether based on warranty, contract, tort, or any other legal theory.

11. Return Goods

Pack with sufficient over-pack to prevent damage during shipment. Damage incurred during return shipment is not covered under this warranty. Repair costs for such damages will be charged back to shipper.

12. Remark

When returning goods, please show "RETURN GOODS" on all invoices and related shipping documents to prevent any extra charge.